

**ASCAC Meeting  
June 12, 2023**

**Industry Perspective on  
collaborating with SC User  
Facilities**

**Dr. Cristina U Thomas,  
Senior Director, R&D**



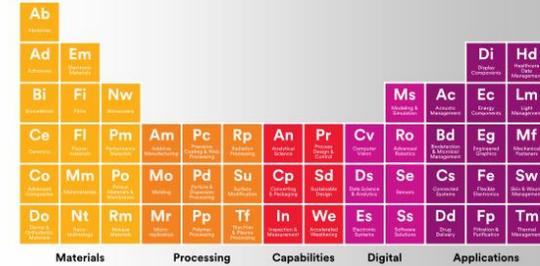
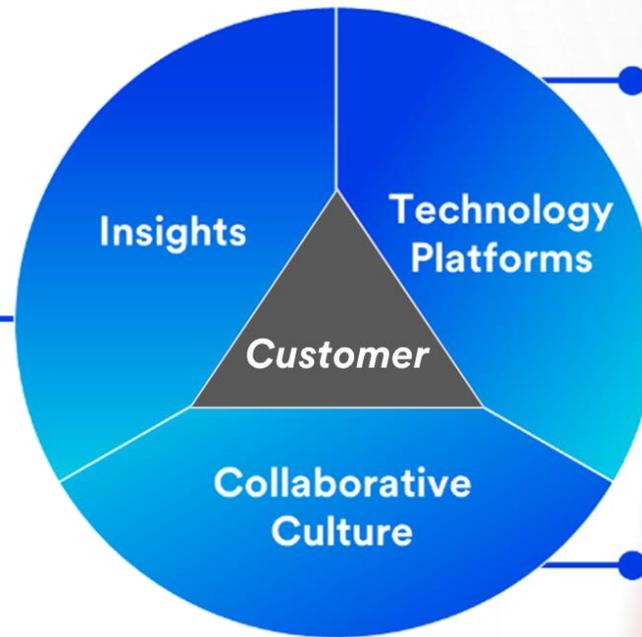
# 3M Innovation

## Our Vision

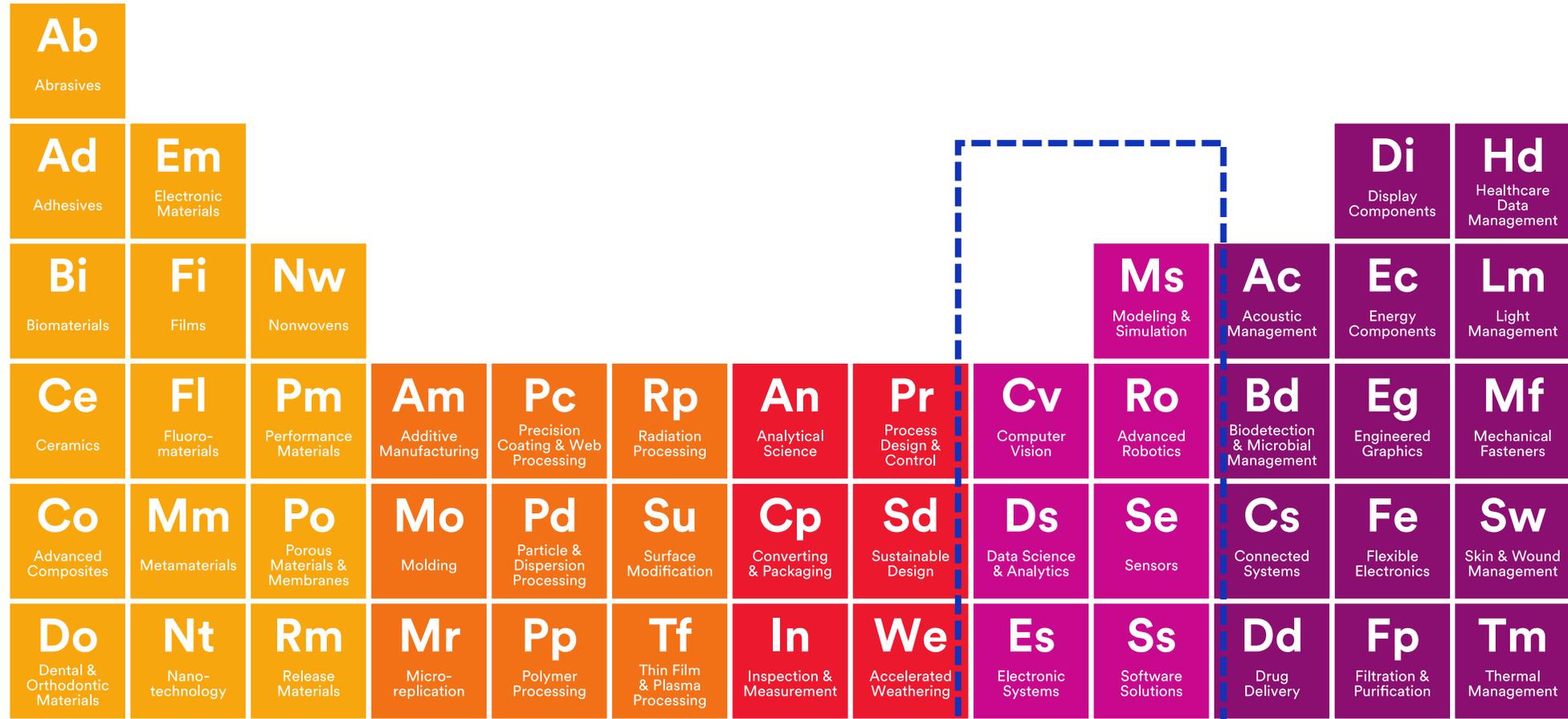
3M Technology Advancing Every Company

3M Products Enhancing Every Home

3M Innovation Improving Every Life



# 3M Technology Platforms



**Materials**

**Processing**

**Capabilities**

**Digital**

**Applications**

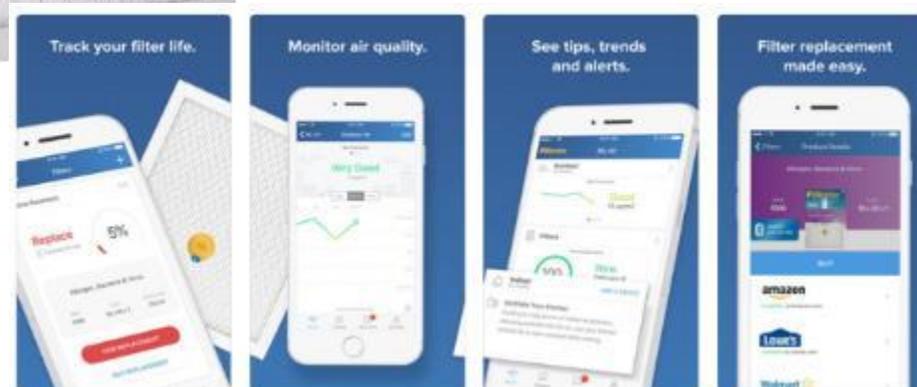


# Creating New Products & Solutions



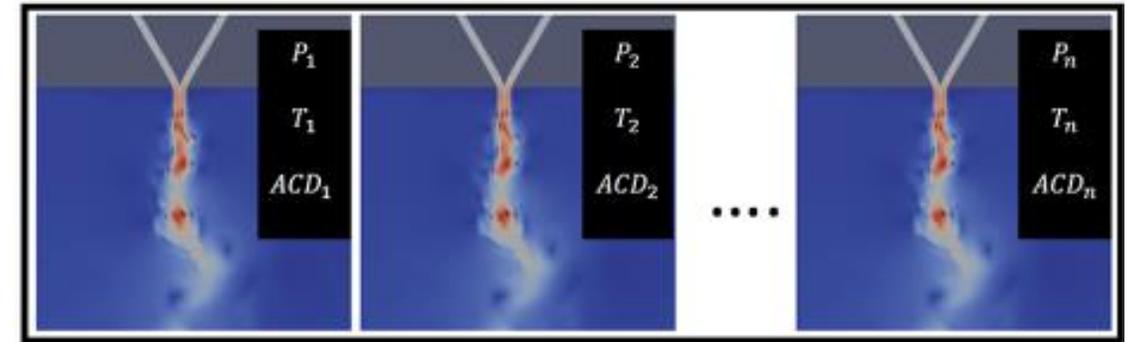
Digital Orthodontics – 3M™ Clarity™ Aligners

Filtrete™ Smart Filter and App



# SC User Facilities and Expertise

## *Establishing Partnerships to Drive New Insights and Actions*



10,000+ “virtual” DOEs – Melt Blown Process

**Awarded by US Department of Energy’s Advanced Manufacturing Office**

-- CRADA NO. A18178 with Argonne National Laboratory under its U.S. Department of Energy Contract No. DE-AC02-06CH11357

-- Project Task Statement #2 for Argonne-3M Umbrella CRADA, Reference ACK No. A20018 PTS #2 under its U.S. Department Energy Contract No. DE-AC02-06CHI 1357

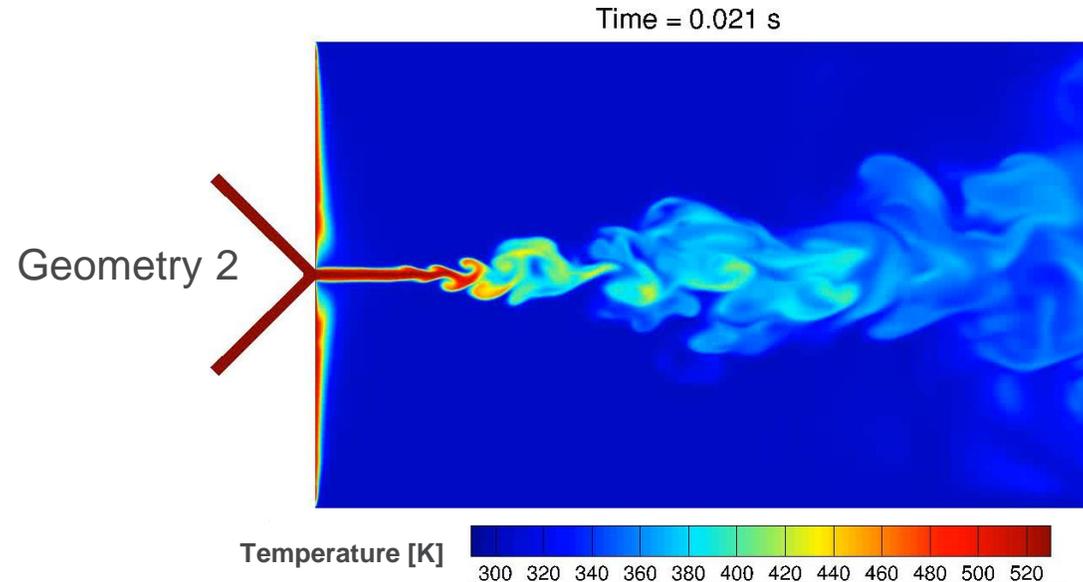
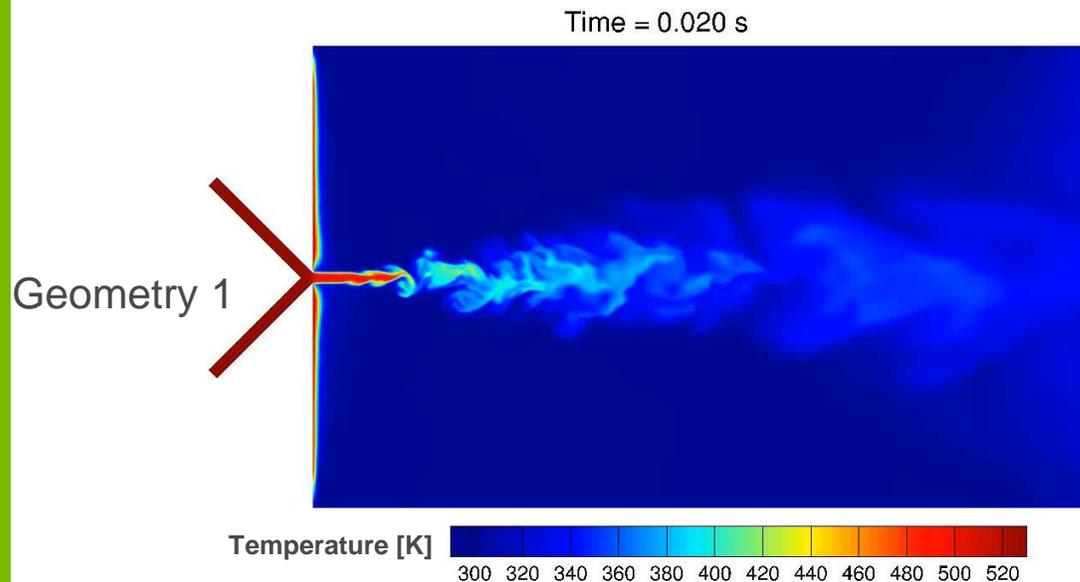
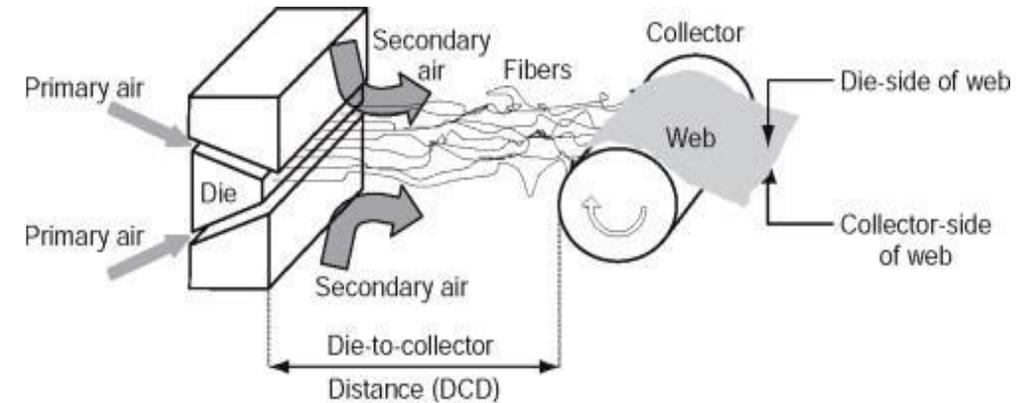
A. Flage, W. Klinzing, D. Dasgupta, M. Schwarting, B. Blaiszik, N. Paulson, I. Foster



# NEXT GENERATION NONWOVENS MANUFACTURING

## Melt Blown (MB) fiber manufacturing

- Goal: Minimize energy consumption for the melt-blown process using HPC, CFD, and ML
- Approach:
  - High fidelity Large-Eddy Simulations for the process with air and develop process-relevant metrics for effective comparison between designs and flow conditions.
  - Machine Learning relates the process conditions and geometry with the metrics to suggest new simulation conditions and subsequently an optimal geometry
  - Automated generation of multiple geometries for simulations to reduce time-to-simulations.
  - Utilized Argonne's Leadership Computing Facility (ALCF) and Laboratory Computing Resource Center (LCRC)



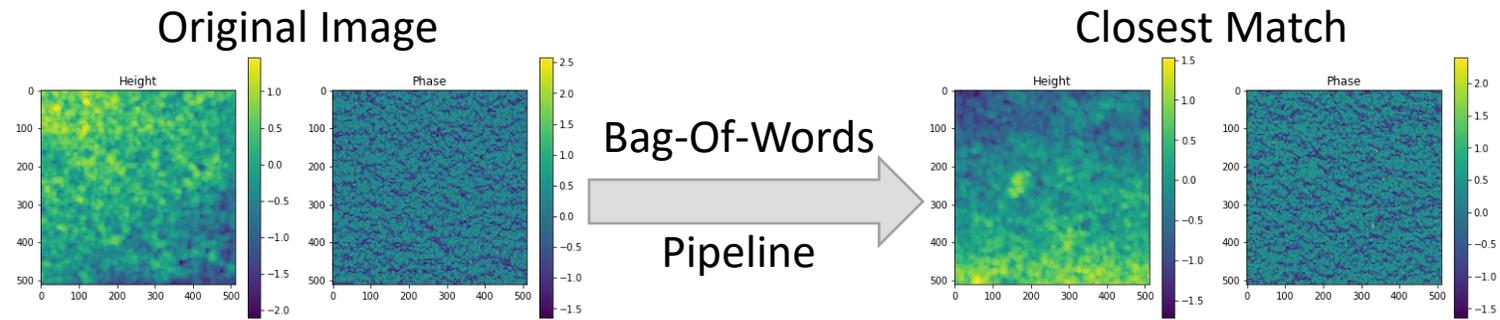
# Establishing Partnerships to Drive New Insights and Actions



## AFM Reverse Image Search for Material Design



*Umbrella CRADA  
2020-20018 –  
November 2019*



with S. Rhyner, M. Schwarting, B. Blaiszik, I. Foster

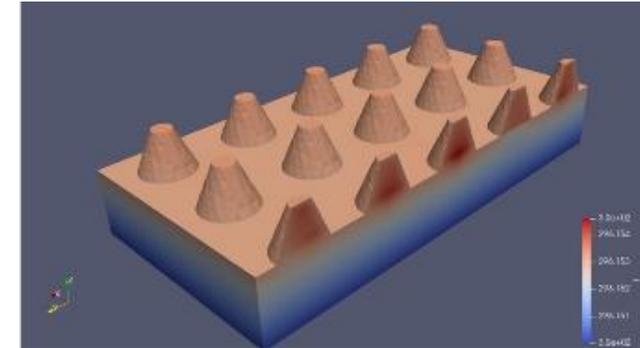
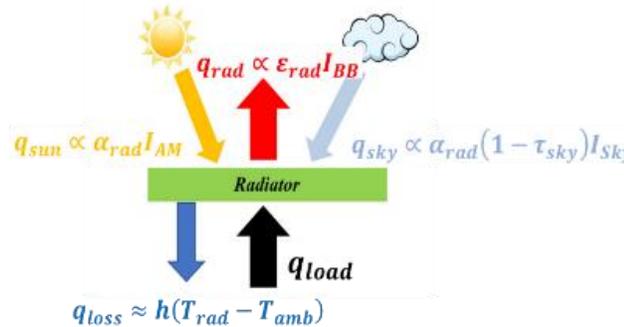
# Establishing Partnerships to Drive New Insights and Actions



Multi-physics approaches for the design and manufacturing of processes and materials



Umbrella CRADA SC14/01821.00.00



Metamaterial films for passive solar cooling

A disruptive approach to design and development of new and improved materials for engineering applications

... simultaneously utilizing physical theory, advanced computational methods and models, materials properties databases and complex calculations

GOMA, R. Secor and R. Schunk  
currently E. Vandre, R. Rao

**Thank you!**